

Remarks

Claims 1-17, 22-26, 44 and 55-85 have been canceled, leaving claims 18-21, 27-43 and 45-54 in the application.

All of the claims containing the word "rigidity" have been canceled to advance the present application and these claims may be made the subject of a further application. The cancellation of these claims overcomes the rejections under §112, first and second paragraphs and the objection to the drawings. The §112, first paragraph, rejection was also applied against claims that do not include "rigidity" and it is believed that this was an oversight. If the rejection was intended to be applied against claims that do not contain "rigidity" then a detailed explanation of the basis for such a rejection is respectfully requested.

The Official Action rejects claim 18 and several of the claims dependent therefrom for not properly reciting the means-plus-function limitation. Reconsideration and withdrawal of this rejection are respectfully requested because claim 18 states "said buffer layer means for providing at least one electrical contact between said one external electrode pad and said at least one external electrode and for absorbing and/or relaxing a stress applied to said at least external electrode to make said interconnection board free from application of said stress" (emphasis added). This is a clear statement of function that

meets the requirements of §112, sixth paragraph, which is to be applied to this element. The "for" is not at the beginning of the element definition, but there is no requirement for such a grammatical construction. As noted in MPEP §2173, the focus is on whether the claim meets the threshold requirement of clarity and precision, not whether more suitable language or modes of expression are available. The Official Action declines to apply §112, sixth paragraph, in view of this grammar issue. This refusal improperly places form over substance and application of §112, sixth paragraph is respectfully requested.

The Official Action also declines to apply §112, sixth paragraph, because the phrase "means for" is modified by sufficient structure to achieve the specified function (page 32 of the Official Action). The only structure in this claim limitation is "a first surface in contact with said second surface of said interconnection board and a second surface on which at least one external electrode is provided." That is, the buffer layer means includes two surfaces. Two surfaces are not sufficient structure "for providing at least one electrical contact between said one external electrode pad and said at least one external electrode and for absorbing and/or relaxing a stress applied to said at least external electrode to make said interconnection board free from application of said stress." The Official Action does not explain how these two surfaces can

perform these functions or why the two surfaces are believed to be sufficient to perform the stated function. Indeed, two surfaces cannot perform these functions and application of §112, sixth paragraph is respectfully requested.

Reconsideration and withdrawal of the rejections under §112, first and second paragraphs, and of the objection to the drawings are respectfully requested in view of the present amendment and the foregoing remarks.

Claims 18-20, 27-37, 43 and 50-53 were rejected as unpatentable over ALLEN et al. 4,705,205 in view of HAYASHI JP 11-238972 and claims 21, 38-42, 45-49 and 54 were rejected as unpatentable further in view of TSUKAMOTO 5,841,194. Reconsideration and withdrawal of the rejection are respectfully requested.

The buffer layer means in claim 18 is to be interpreted under §112, sixth paragraph. Various embodiments of the buffer layer means are disclosed in the specification. The combination of references does not disclose the same or equivalent structure as disclosed in the specification and thus the claimed "means for" (as explained above, the "for" is in the second part of the limitation definition) is missing from the combination and would not be obvious to one of skill in the art.

ALLEN et al. disclose a device in which solder preforms 28 absorb stress applied to the external electrodes. The solder

preforms 28 are columns that flex, such as shown in Figure 3B. In order to place the solder preforms 28 in the proper position, ALLEN et al. use a retaining member 22 that does not interfere with the motion of the preforms (column 13, lines 66-68). The retaining member 22 is there to hold preforms 28 and serves no other purpose. The solder preforms 28 appear to perform generally a similar function as claimed for the buffer layer means, but their column structure is not the same or equivalent to the layer structure of the present invention. The columns are tall and thin to flex while the layer absorbs the stress over a large area. HAYASHI adds nothing in this regard (it is relied upon for the suggestion to make the electrode pad flush) and thus the combination does not disclose or suggest the buffer layer means of amended claim 18.

Claim 43 has been amended and includes a buffer layer that is separate from a supporting plate. ALLEN et al. do not disclose a device with both a buffer layer and a supporting plate as claimed in amended claim 43, which avoids the rejections under §103.

The Official Action takes the position that the supporting layer in ALLEN et al. is retaining member 22 and that the buffer layer is element 20. However, element 20 is the general designation for the preform placement device (column 12, line 42) that includes retaining member 22. Elements 20 and 22

in ALLEN et al. are the same and thus ALLEN et al. do not suggest the separate supporting plate and buffer layer now claimed. HAYASHI adds nothing in this regard and thus the combination does not disclose or suggest the supporting plate and buffer layer of amended claim 43.

New claims 86-88 are supported by the drawings of Figures 12 and 13 as well as descriptions made with reference to those drawings. Claim 86 defines a specific structure of the "buffer layer means" recited in claim 18.

Applicant believes that new claim 86 is distinguishable from ALLEN et al. because either of the following first and second structural limitations in new claim 86 is not disclosed in or taught by ALLEN et al.

The first structural limitation may read on "a metallic frame formed in said side of said first surface to surround said metallic post, a gap being thereby formed between said metallic post and said metallic frame".

The second structural limitation may read on "a resin layer filling said gap".

The above-described first structural limitation of claim 86 provides the following effects. The presence of the "metallic frame" reduces a mechanical force applied to the metallic post when the semiconductor device is handled.

The above-described second structural limitation of claim 86 provides the following effects. The resin layer is also present, which fills the gap between the metallic post and the metallic frame, thereby avoiding a leakage of resin during the manufacturing processes.

New claim 87 includes a third limitation that "an exposed surface of the external electrode pad and the second surface form a flat plate". The third limitation of claim 87 substantially corresponds to the "so that" clause of claim 18. The third limitation indirectly represents such a trace that "the interconnection board was fixed to the rigidity plate".

New claim 88 includes a fourth limitation that "a height of the metallic post from the second surface is substantially equal to a height of the metallic frame from the second surface". The third limitation indirectly represents such another trace that the "rigidity plate" was fixed with the interconnection board and then selectively removed to form both the "metallic post" and the "metallic frame" concurrently, from the "rigidity plate".

New claim 89 is supported by the drawing of Figure 24 and the descriptions made with reference to this drawing. New claim 89 defines an additional limitation.

The claim word "metallic frame" in claim 86 corresponds to "supporting frame 25" in Figure 12. The claim word "metallic

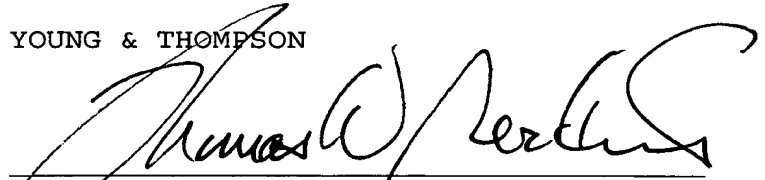
post" in claim 86 corresponds to "metal buffer layers 11" in Figure 12. The claim word "support plate" in claim 89 corresponds to "supporting plate 51" in Figure 24. The claim word "hole" in claim 89 corresponds to "solder ball insertion hole 52" in Figure 24. The claim word "resin material" in claim 89 corresponds to "sealing resin material 54" in Figure 24.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R. §1.17.

Respectfully submitted,

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